

Claims

- 5 1. In a computer system running a computer-aided design (CAD) package and an external application program (EAP), a method, comprising the steps of:
- providing a model of an object in the CAD package, wherein said model includes output data from the EAP;
- modifying the model;
- 10 determining that the modifying of the model requires recalculation of the output data from the EAP; and
- in response to the determining, sending new input data to the EAP and obtaining new output data from the EAP.
- 15 2. The method of claim 1 wherein the method further comprises the step of calling the EAP from the CAD package to obtain the new output data.
3. The method of claim 1 wherein the method further comprises the step of registering the EAP with the CAD package.
- 20 4. The method of claim 3 wherein the registering registers a callback to the EAP from the CAD package.
5. The method of claim 1 wherein the EAP performs analysis on at least a portion
- 25 of the model to produce the original output data and the new output data.
6. The method of claim 5 wherein the analysis is an engineering analysis.
7. The method of claim 1 wherein the method further comprises the steps of:
- 30 further modifying the model;
- determining that the further modifying of the model requires further recalculation of the output data from the EAP; and

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in response to the determining that the further modifying of the model requires further recalculation of the output data, obtaining new output data from the EAP.

- 5 ~~8.~~ In a computer system having a computer-aided design (CAD) package for manipulating a model of an object, a method, comprising the computer-implemented steps of:

exporting data from a CAD model in a CAD program to an external application program (EAP);

- 10 using the exported data as input data to execute the EAP and obtain output data from the EAP;

importing the output data into the CAD program from the EAP;

integrating the output data into the CAD model;

- 15 modifying the CAD model so that the input data to the EAP changes to new input data;

updating the output data by calling the EAP and passing the new input data to the EAP; and

automatically integrating the updated output data into the CAD model without a user request.

- 20 9. The method of claim 8 wherein the method further comprises the step of registering the EAP with the CAD program.

10. The method of claim 9 wherein the registering comprises registering a callback that is called from the CAD program to access the EAP.

- 25 11. The method of claim 8 wherein the CAD model is a feature-based model.

12. The method of claim 8 wherein the CAD model is a parametric model.

- 30 ~~13. The method of claim 8 wherein the integrating comprises adding parameters to the CAD model.~~

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14. The method of claim 8 wherein the integrating comprises adding geometric entities to the CAD model.

5 15. A computer-aided design (CAD) system, comprising:
a CAD program;
an external application program (EAP) that is external to the CAD program;
a model of an object that contains output data from the EAP; and
10 a registration facility for registering the EAP with the CAD program so that the CAD program calls the EAP when the output data from the EAP in the model needs updating as a result of changes to the model.

16. The CAD system of claim 15 wherein the registration facility registers a callback
15 from the CAD program to the EAP.

17. The CAD system of claim 15 wherein the model is a feature-based model.

18. The CAD system of claim 15 wherein the model is a parametric model.

20 19. In a computer system running an external application program (EAP) and a computer-aided design (CAD) package with a model of an object that includes output data from the EAP, a computer-readable medium holding computer-executable instructions for performing a method, comprising the computer-implemented steps of:
25 modifying the model;
determining that the modifying of the model requires recalculation of the output data from the EAP; and
in response to the determining, sending new input data to the EAP and
30 obtaining new output data from the EAP.

20. The computer-readable medium of claim 19 wherein the method further comprises the step of calling the EAP from the CAD package to obtain the new output data.
- 5 21. The computer-readable medium of claim 19 wherein the method further comprises the step of registering the EAP with the CAD package.
22. The computer-readable medium of claim 21 wherein the registering registers a callback to the EAP from the CAD package.
- 10 23. The computer-readable medium of claim 19 wherein the EAP performs analysis on at least a portion of the model to produce the output data and the new output data.
- 15 24. In a computer system having a computer-aided design (CAD) package for manipulating a model of an object, a computer-readable medium holding computer-executable instructions for performing a method, comprising the computer-implemented steps of:
- 20 importing output data into the CAD program from an external application program (EAP);
- integrating the output data into the model;
- modifying the model so as to require updating of the output data; and
- automatically updating the output data by calling the EAP with new input data without a user request.
- 25 25. The computer-readable medium of claim 24 wherein the model is feature-based.
26. The computer-readable medium of claim 28 wherein the model is parametric.

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